

Docket No. 1021.43050X00  
Serial No. 10/643,975  
Office Action dated March 21, 2007

## **REMARKS**

### **I. Introduction**

By the present Amendment, claims 1 and 9 have been amended. No claims have been added or cancelled. Accordingly, claims 1-10 remain pending in the application. Claims 1, 2, and 7 are independent.

### **II. Office Action Summary**

In the Office Action of March 21, 2007, the Specification was objected to under 37 CFR §1.75(d)(1) as failing to provide proper antecedent basis for the claimed subject matter. Claim 1 was objected to because of an informality. Claims 7-10 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claims 7 and 8 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,683,922 issued to Hayami et al. ("Hayami") in view of U.S. Patent Application Publication No. 2002/0067677 to Miyashita et al. ("Miyashita"). These rejections are respectfully traversed.

### **III. Allowable Subject Matter**

The Examiner's indication that claims 1-6 are allowed, and that claim 9 would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims, is noted with appreciation.

### **IV. Objections to the Specification and Claims**

The Specification was objected to under 37 CFR §1.75(d)(1) as failing to provide proper antecedent basis for the claimed subject matter. Regarding this objection, the Office Action provides a passage which required correction. Claim 1

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was objected to because of informalities in the same passage resulting in the objection to the specification. Regarding this objection, the Office Action provides various instances of language containing grammatical errors.

By the present Amendment, Applicants have made appropriate corrections to independent claim 1 to address all of the objections noted in the Office Action. Withdrawal of this objection with respect to the specification and claims is therefore respectfully requested.

**V. Rejections under 35 USC §112**

Claims 7-10 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action provides examples of several phrases that were indefinite and/or otherwise lacking in proper antecedent basis.

Regarding Independent claim 7, the Office Action indicates that the limitation "said drive" lacked proper antecedent basis. Applicants respectfully disagree. The "drive" has already been recited in the preamble (i.e., an information reproducing drive) prior to the rejected instance. Thus, proper antecedent basis currently exists for this language.

Regarding claim 9, Applicants have made appropriate amendments to clarify that the output of the waveform equalizer is being subtracted. Withdrawal of this rejection is therefore respectfully requested.

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**VI. Rejections under 35 USC §103**

Claims 7 and 8 were rejected under 35 USC §103(a) as being unpatentable over Hayami in view of Miyashita. Regarding this rejection, the Office Action alleges that Hayami discloses an information reproducing drive for outputting a binary value obtained from a reproduced signal with the use of a PRML method. The drive allegedly comprises a PR target output unit, a decode unit that includes a pattern compensation table for storing compensation values, and a branch metric calculation unit as set forth in the claimed invention. The Office Action admits that Hayami fails to explicitly disclose the information reproducing drive further comprising a waveform equalizer for equalizing a reproduced signal. Miyashita is relied upon for disclosing an information reproducing drive that further comprises a waveform equalizer for equalizing a reproduced signal. Applicants respectfully disagree.

Independent claim 7 defines an information reproducing drive that outputs a library value obtained from a reproduced signal using a PRML method. The drive comprises:

- a PR target output unit for outputting a PR class target value corresponding to an N-bit bit array;
- a decode unit including a pattern compensation table for storing a compensation value corresponding to each M-bit ( $M > N$ ) bit array;
- a waveform equalizer for equalizing a reproduced signal; and
- a branch metric calculation unit for calculating a branch metric value for each bit array by employing a target value obtained by adding up a PR target value output from said PR target value output unit and a compensation value stored in said pattern compensation table with respect to an output from said waveform equalizer.

According to independent claim 7, the information reproducing drive includes a PR target output unit, a decode unit, a waveform equalizer, and a branch metric calculation unit. The PR target output unit outputs a PR class target value

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corresponding to an N-bit array. The decode unit includes a pattern compensation table for storing a compensation value corresponding to each M-bit ( $M > N$ ) bit array. The waveform equalizer is used to equalize a reproduced signal. The branch metric calculation unit calculates a branch metric value for each bit array by employing a target value obtained by adding up a PR target value output from the PR target value output unit and a compensation value stored in the pattern compensation table with respect to the output from the waveform equalizer.

The Office Action indicates that Hayami discloses a compensation table for storing a compensation value corresponding to each M-bit ( $M > N$ ) bit array and directs attention to Figs. 4 and 6. Applicants' review of Hayami suggests otherwise. The table of Hayami corresponds to target levels (a, b, c, d, e, and f) corresponding to N-bit bit arrays, and not the compensation bit number. Furthermore, the compensation table does not exceed the compensation range of  $2^4$  with respect to the PR (1, 1, 1, 1). Fig. 4 of Hayami specifically discloses the PR (1, 1, 1, 1) class DVDs wherein  $N=4$  and the minimum run length =  $3T$ . If the table of Hayami were to correspond to the M bit ( $M > N$ ), then the target levels would be  $2M$ .

Convolution of the PR class and 4-bit bit array can be used to determine the target level by first representing the target level as:

$$TargetLevel(bit\_array) = \frac{1}{2} \sum_{n=1}^N (bit\_array[N-n] * 2^{n-1}) * PRClass[n] \quad (1)$$

Where:

the coefficient  $\frac{1}{2}$  is used to adapt the expression to the "a, b, c, d, e, and f" of the reference, and

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bit\_array[n] and PRClass[n] represent the n-th value from the left of the bit array and PR class, respectively.

The bit\_array[N-m]\*2-1) converts a "0" and a "1" contained in the bit\_array into a "-1" and "+1", respectively. Since the PRClass[n] is always 1, in the case of the PR (1, 1, 1, 1), the following equation is obtained:

$$TargetLevel(bit\_array) = \frac{1}{2} \sum_{n=1}^N (bit\_array[N-n] * 2 - 1) \quad (2)$$

The target level is thus obtained by determining the difference between the number of "1s" and the number of "0's" contained in the bit array of N=4 bits, and multiplying the difference by 1/2. See table below.

Bit array	State bit	State Name (Hayami)	Target Level	Run Length Limitation
0000	000	S5	-2	
0001	000	S5	-1	
0010	001	-		NG
0011	001	S3	0	
0100	010	-		NG
0101	010	-		NG
0110	011	-		NG
0111	011	S1	+1	
1000	100	S4	-1	
1001	100	-		NG
1010	101	-		NG
1011	101	-		NG
1100	110	S2	0	
1101	110	-		NG
1110	110	S2	+2	
1111	111	S0	+2	

Due to the run-length limitation, among the bit arrays of 4 bits ( $2^4 = 16$ ), the number of effective bit arrays is 8. The number of effective states is 6 (S0, S1, S2, S3, S4,

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and S5), and the number of target levels is 5 (-2, -1, 0, +1, and +2). As can be seen, the target levels of Hayami do not exceed the compensation range of  $2^4$  with respect to PR (1, 1, 1, 1).

It is therefore respectfully submitted that Independent claim 7 is allowable over the art of record.

Claims 8-10 depend from Independent claim 7, and are therefore believed be allowable for at least the reasons set forth above with respect to Independent claim 7. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

#### **VII. Conclusion**

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

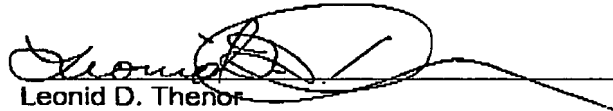
If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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**AUTHORIZATION**

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 1021.43050X00).

Respectfully submitted,  
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